

1. In a system for feeding medication from a remote source through tubing means into a patient, a connector including:

(a) port means attached to the tubing means through which the medication is introduced into the tubing means,

(b) means sealing the port means which is penetrated by a needle that is in communication with the source of medication and through which the medication flows into the tubing means, and

(c) a cap member detachably secured to the port means, said cap member having a cavity therein in which the needle is safely housed by being recessed deep within the cavity so that it will not likely be contaminated by bacteria or stick a user of the connector.

2. The connector of Claim 1 wherein the cavity has an open mouth into which the port means is manually inserted when the cap member is secured to the port means, said open mouth being constricted so that only the very tip of the little finger of a typical adult user will fit into the cavity.

3. The connector of Claim 2 wherein the needle has its tip displaced inwardly a substantial distance from the open mouth so that, even if said user intentionally inserted his or her finger into the open mouth, the tip of the needle would not stick said finger.

4. The connector of Claim 3 wherein the maximum width of the open mouth does not exceed about one centimeter and the tip of the needle is displaced inwardly from the open mouth a minimum distance of about one centimeter.

5. The connector of Claim 3 wherein the cavity is formed by a first wall element which surrounds the needle and the port means is formed by a second wall element, said first and second wall elements engaging when the cap member is secured to the port means to serve as guide means for directing the needle into the sealing means.

6. The connector of Claim 5 wherein the needle is disposed lengthwise along the longitudinal axis of the cavity and aligned to penetrate the central portion of the sealing means and not scrape against the inside of the second wall element as the cap member is secured to the port means.

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7. The connector of Claim 6 wherein the cavity is tapered inwardly from the open mouth.

8. The connector of Claim 1 having snap-on type means for detachably securing the cap member to the port means.

9. The connector of Claim 1 having slip-on/twist means for detachably securing the cap member to the port means.

10. The connector of Claim 1 made of a transparent plastic material.

11. The connector of Claim 1 wherein the port means is an integral part of a conventional piggyback connector and includes means which lock with means on the cap member.

12. The connector of Claim 1 including means for producing a sound when the cap member and port means are securely attached to each other, thereby providing an audible signal that this condition exists.

13. The connector of Claim 1 wherein the sealing means is of the self-sealing type and the cap member and port means are precision made so that with repeated use the needle will penetrate the sealing means at essentially the same point each time it is inserted through the sealing means.

14. The connector of Claim 1 wherein the cap member and port means engage in a male-female mating relationship when secured together, with the cap member serving as the female member and the port means serving as the male member.

15. In a system for feeding medication from a remote source through tubing means into a patient, a connector including:

(a) port means attached to the tubing means through which the medication is introduced into the tubing means,

(b) means sealing the port means which is penetrated by a needle that is in communication with the source of medication and through which the medication flows into the tubing means, said sealing means being of the self sealing type so that a hole in the sealing means produced by penetration of the needle is closed off upon withdrawal of the needle, and

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(c) a cap member detachably secured to the port means, said cap member having a cavity therein in which the needle is safely housed by being recessed deep within the cavity so that it will not likely be contaminated by bacteria or stick a user of the connector, said cavity having an open mouth into which the port means is manually inserted when the cap member is secured to the port means, said open mouth being constricted so that only the very tip of the little finger of a typical adult user will fit into the cavity, with said needle being disposed lengthwise along the longitudinal axis of the cavity and aligned to penetrate the central portion of the sealing means, and having its tip displaced inwardly a substantial distance from the open mouth so that, even if the user intentionally inserted his or her finger into the open mouth, the tip of the needle would not stick said finger.

16. The connector of Claim 15 wherein the maximum width of the open mouth does not exceed about one centimeter and the tip of the needle is displaced inwardly from the open mouth a minimum distance of about one centimeter.

17. The connector of Claim 15 wherein the cavity is formed by a first cylindrical wall element which surrounds the needle and the port means is formed by a second cylindrical wall element having an open end which is sealed by the sealing means, said wall elements being coaxially aligned and engaging in a male-female mating relationship when the cap member is secured to the port means, with the interior surface of the first wall element, sliding over the exterior surface of the second wall element whereby said wall elements serve as guide means for directing the needle into the central portion of the sealing means so that the tip of the needle does not scrape particles from the inside surface of the second wall element.

18. The connector of Claim 17 wherein cap member and port means are precision made so that with repeated use the needle will penetrate the sealing means at essentially the same point each time it is inserted through the sealing means.

19. The connector of Claim 15 including means for producing a sound when the cap member and port means are securely attached to each other, thereby providing an audible signal that this condition exists.

20. In a system for feeding medication from a remote source through tubing means into a patient, a connector including:

(a) port means attached to the tubing means through which the medication is introduced into the tubing means,

(b) means sealing the port means which is penetrated by a needle that is in communication with the source of medication and through which the medication flows into the tubing means, said sealing means being of the self sealing type so that a hole in the sealing means produced by penetration of the needle is closed off upon withdrawal of the needle, and

(c) a cap member detachably secured to the port means, said cap member having

(i) a cavity therein in which the needle is safely housed by being recessed deep within the cavity so that it will not likely be contaminated by bacteria or stick a user of the connector, said cavity having an open mouth into which the port means is manually inserted when the cap member is secured to the port means,

(ii) said open mouth being constricted so that only the very tip of the little finger of a typical adult user will fit into the cavity, with said needle being disposed lengthwise along the longitudinal axis of the cavity and aligned to penetrate the central portion of the sealing means, and having its tip displaced inwardly a substantial distance from the open mouth so that, even if the user intentionally inserted his or her finger into the open mouth, the tip of the needle would not stick said finger,

(iii) said cavity being formed by a first wall element which surrounds the needle and the port means being

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formed by a second wall element having an open end which is sealed by the sealing means, said wall elements being coaxially aligned and engaging in a male-female mating relationship when the cap member is secured to the port means, with the interior surface of the first wall element sliding over the exterior surface of the second wall element, whereby said wall elements serve as guide means for directing the needle into the central portion of the sealing means so that the tip of the needle does not scrape particles from the inside surface of the second wall element,

- (iv) With said cap member and port means being precision made so that with repeated use the needle will penetrate the sealing means at essentially the same point each time it is inserted through the sealing means.

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✓ 21. The connector of Claim 20 including means for producing a sound when the cap member and port means are securely attached to each other, thereby providing an audible signal that this condition exists.

22. A cap member for connecting a source of medication to a tubular conduit, comprising:

a connector section having a hollow interior which forms a cavity having an open end adapted to receive the tubular conduit, said end being constricted so that a finger will not fit into the cavity, and

a needle disposed lengthwise within the cavity and of a length such that its tip is displaced inwardly from the open end of the cavity, said needle being secured at the end opposite said tip to the connector section and adapted to be placed in communication with the source of medication.

23. The cap member of Claim 16 wherein the connector section is cylindrical and the needle is disposed along the longitudinal axis of said cylindrical connector section.

✓24. The cap member of Claim 23 wherein the cylindrical connector section is taped inwardly from the open end of the cavity.

25. The cap member of Claim 22 wherein the open mouth has a maximum width no greater than about one centimeter and the tip of the needle is at least one centimeter from the open mouth.

26. The cap member of Claim 25 wherein the connector section and tubular conduit engage in a male-female mating relationship when attached to each other.

27. The cap member of Claim 22 including snap-on type means for detachably securing said cap member to the tubular conduit.

✓28. The cap member of Claim 22 including slip-on/twist lock type of means for detachably securing said cap member to the tubular conduit.

✓29. The cap member of Claim 22 including means to produce a sound when said cap member is secured to the tubular conduit.

30. A connector for introducing medication into a patient comprising a pair of tubular members adapted to engage in a mating relationship and be detachably secured together, one of said members having a sealed port and the other having deeply recessed therein a needle which penetrates the central portion of the port when the tubular members engage in said mating relationship, and means which produce a sound when the tubular members are secured together to provide an audible signal that said members are safely locked together.

31. The connector of Claim 30 wherein the tubular members are secured together by snap-on type means.

32. The connector of Claim 30 wherein the tubular members are secured together by slip-on/twist lock type means.

33. The connector of Claim 30 wherein the tubular members are precision made so that with repeated use, the needle will penetrate the sealed port at essentially the same point each time the tubular members engage.

✓34. A connector for introducing medication into a patient comprising,

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a first tubul^ur member having one end adapted to be placed in communication with the patient and an opposed end including a sealed port through which the medication is introduced, said first tubular member having lip means adjacent the sealed port; a second tubular member having an open end and being adapted to receive in its open end the sealed port when the tubular members engage in a male-female mating relationship, said second tubular member

- (i) having on its exterior the first component of a two component hinge means and
- (ii) recessed therein a needle which is disposed generally along the longitudinal axis of the second tubular member and has its one end secured to the closed end of the second tubular member and its opposed end displaced inwardly from the open end and free to penetrate the central portion of the sealed port when the tubular members engage in said mating relationship; and

clip means for detachably securing the first and second tubular members together, said clip means including

- (i) a handle element having catch tip means at one end adapted to engage and lock unto the lip means when the tubular members engage,
- (ii) spring means near the end of the handle element opposite the catch tip means,
- (iii) the second component of the hinge means disposed between the opposed ends of the handle, said second component being coupled to the first component to allow the handle to pivot about the hinge means between a locked position with the catch tip means grasping the lip means and an unlocked position disengaging the catch tip means and the lip means when the handle is depressed by an externally applied force to bias the spring means to return the handle to its locked position as soon as the externally applied force is removed.

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(iv) and clapper bar means on the handle which is lifted away from the exterior of the second tubular member when the handle is depressed and which strikes said exterior upon release of the handle to produce a sound which indicates that the handle is in the locked position.

35. In a medical connector system in which a port at the end of a tubular conduit is provided with a seal that is penetrated by a needle through which medication is to be introduced into the system, said seal being self-sealing upon withdrawal of the needle, the improvement comprising means adjacent the seal which engages a locking mechanism on a cap member carrying the needle and detachably secures the cap member to the tubular conduit.

✓36. The improved connector system of Claim 35 wherein the securing means comprise threads which screw into threads on the cap member.

37. The improved connector system of Claim 35 wherein the securing means comprise an annular member that provides a lip which locks with the locking mechanism.

✓38. The improved connector system of Claim 35 wherein the securing means are slit means which engage pins on the cap member.

✓39. The improved connector system of Claim 35 wherein the securing means comprise groove means which locks with the locking mechanism.

✓40. The improved connector system of Claim 35 including means to produce a sound when the locking mechanism has secured the cap member to the tubular conduit.

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